

**National Emergency Services Academy, CIVIL AIR PATROL**  
**Mission Aircrew School**  
**SCANNER TRAINING**  
**STUDENT**  
**A Flight / East Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

**EAST / SOUTHEAST TRAINING TARGETS**

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1       Power Plant   Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.       Bridge       Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

**RETURN TO COLUMBUS (BAK)**

1.       Return via North Vernon, and point out landmarks and terrain features.
2.       Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.       Grease the landing.

**C. DEBRIEFING**

1.       Answer any questions.
2.       Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3.       Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4.       Complete the 104.
5.       Sign the trainee's qualification card or 101-T.

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6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
  
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

**National Emergency Services School, Civil Air Patrol  
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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
A Flight / Area A**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss purpose of the flight:
  - a. Locate the following communications equipment and discuss their use:
    - 1) Nav/Comms
    - 2) DME
    - 3) ADF
    - 4) GPS
    - 5) CAP radio
    - 6) Audio panel
    - 7) Intercom
    - 8) Push-to-talk pushbuttons and mike
  - b. Assist the pilot with radio aids:
    - 1) Set up radios (tower frequency)
    - 2) Obtaining taxi and takeoff clearances
    - 3) Mission Base reports (FM radio)
    - 4) Obtaining weather updates in-flight
    - 5) Pilot Weather Reports (PIREP)
  - c. Route search – See below for details
3. Initiate a 104.
4. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Observe operation of the communications and navigation equipment.
  - b. Contact BAK Tower (118.6) and give required information.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**A Flight / Area A**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn north towards Shelbyville VOR (112.0) and perform the following tasks:
    - A. Verify the morse code.
    - B. Determine radial (188°).
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to GEZ.
    - F. Select GEZ as destination in GPS.
    - G. Enter N 39° 22' W 48° 46' as a waypoint, fly to it, and describe the nearest landmark (Norristown).
    - H. Write down cross-radials at this point using SHB and OOM (179° and 070°).

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STUDENT  
A Flight / Area A**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search to Greensburg-Decatur Co.
  - a. Depart BAK
  - b. Direct GEZ (Shelbyville Apt)
  - c. Start search direct I34 (Greensburg-Decatur Co.)
  - d. Return direct BAK
2. Search should be conducted at 1000' AGL, 1 nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the outbound course from GEZ to I34.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**A Flight / Area A**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 50D, entering at the southwest corner, and use NS headings for  $\frac{1}{4}$  grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**A Flight / Area A**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**A Flight / Area A**

**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**A Flight / Area A**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search northwest-bound from Homer N 39° 35' W 85° 35' to Carthage N 39 40' W 085 35'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the SHB VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**A Flight / Area A**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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MISSION AIRCREW SCHOOL  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE  
STUDENT  
A Flight / Area A**

**B. CREEPING LINE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE</b> <b>STUDENT</b> <b>A Flight / Area A</b></p>
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PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A expanding square search in St Louis 50B starting at N 39 41' W 085 50'.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**A Flight / Area A**

3. Discuss purpose of the flight:
  - a. How to plan and execute a expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT A Flight / Area A</b></p>
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B. EXPANDING SQUARE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**A Flight / Area A**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an ABQ sectional, a clipboard with blank paper, and an aeronautical protractor.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**A Flight / Area A**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search. The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

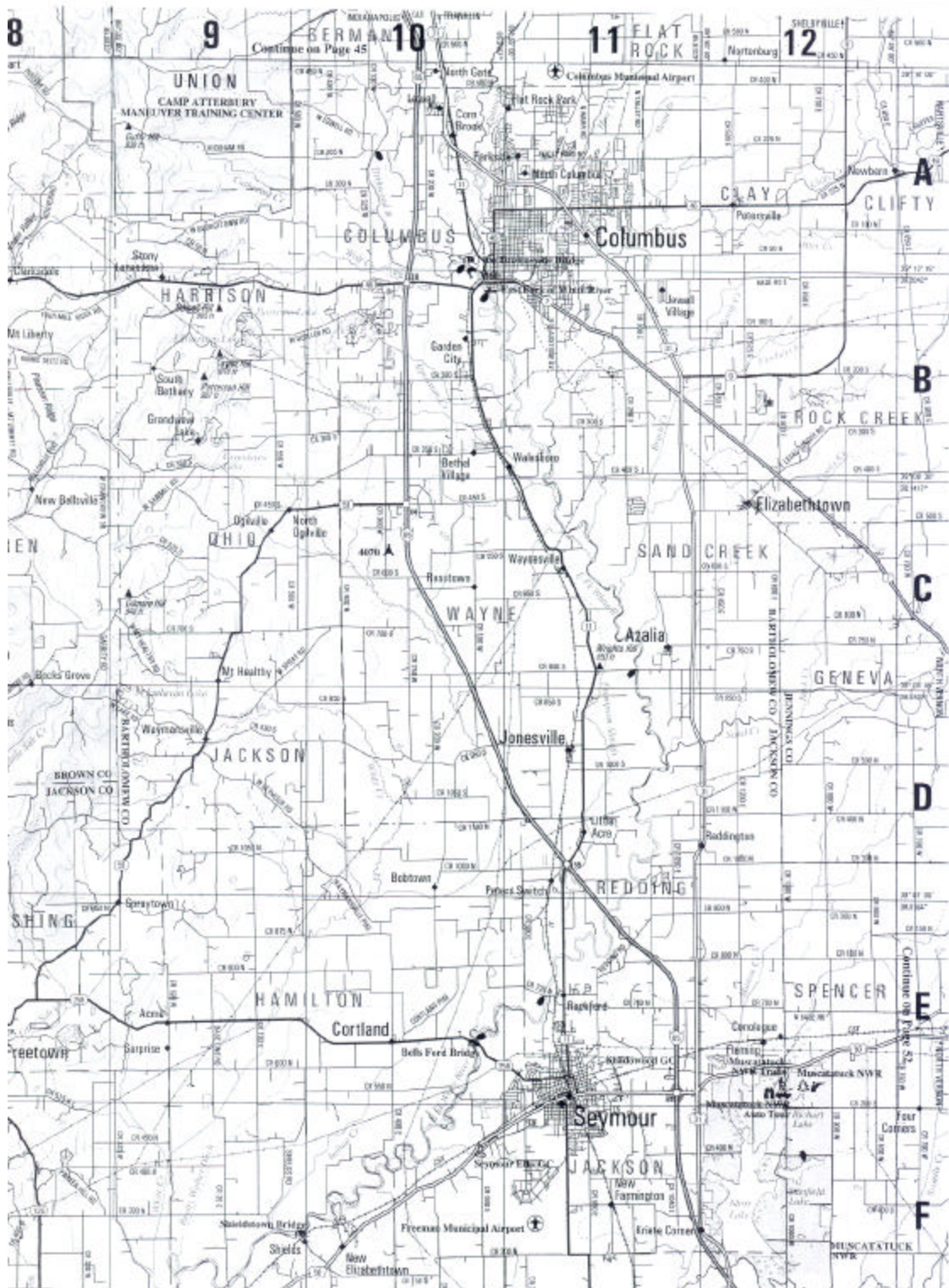
**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**A Flight / Area A**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to AMA, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee obtain ATIS information and then contact AMA Approach Control.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



**National Emergency Services Academy, CIVIL AIR PATROL**  
**Mission Aircrew School**  
**SCANNER TRAINING**  
**STUDENT**  
**B Flight / West Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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**STUDENT**  
**B Flight / West Route**

- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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**B Flight / West Route**

items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### EAST / SOUTHEAST TRAINING TARGETS

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1     Power Plant     Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.     Bridge         Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

#### RETURN TO COLUMBUS (BAK)

<p>National Emergency Services Academy, CIVIL AIR PATROL Mission Aircrew School <b>SCANNER TRAINING</b> <b>STUDENT</b> <b>B Flight / West Route</b></p>
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1. Return via North Vernon, and point out landmarks and terrain features.
2. Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3. Grease the landing.

C. DEBRIEFING

1. Answer any questions.
2. Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3. Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4. Complete the 104.
5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

**National Emergency Services School, Civil Air Patrol  
Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
B Flight / Area B**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss purpose of the flight:
  - a. Locate the following communications equipment and discuss their use:
    - 1) Nav/Comms
    - 2) DME
    - 3) ADF
    - 4) GPS
    - 5) CAP radio
    - 6) Audio panel
    - 7) Intercom
    - 8) Push-to-talk pushbuttons and mike
  - b. Assist the pilot with radio aids:
    - 1) Set up radios (tower frequency)
    - 2) Obtaining taxi and takeoff clearances
    - 3) Mission Base reports (FM radio)
    - 4) Obtaining weather updates in-flight
    - 5) Pilot Weather Reports (PIREP)
  - c. Route search – See below for details
3. Initiate a 104.
4. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Observe operation of the communications and navigation equipment.
  - b. Contact BAK Tower (118.6) and give required information.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**B Flight / Area B**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn Northeast towards St. Louis #78. Tune to the Shelbyville VOR (112.0) and perform the following tasks:
    - A. Verify the morse code.
    - B. Determine radial.
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to I34.
    - F. Select I34 as destination in GPS.
    - G. Enter N 39° 26' W 085° 36' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using SHB and RID.

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
B Flight / Area B**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search of St Louis #78 railroad, entering at the Waldron, Southeast to Greensburg and return covering Hwy 74.
2. Search should be conducted at 1000' AGL, 1 nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (121.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**B Flight / Area B**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 79B, entering at the northeast corner, and use NS headings for ¼ grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**B Flight / Area B**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**B Flight / Area B**

**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>B Flight / Area B</b></p>
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**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search northwest-bound from Greensburg N 39° 22' W 085° 15' (Hwy 74). At a minimum continue past Whelen (pvt). Stop by Henneman N 39° 31' W 085 42'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the SHB VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**B Flight / Area B**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL  
MISSION AIRCREW SCHOOL  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE  
STUDENT  
B Flight / Area B**

**B. CREEPING LINE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT B Flight / Area B</b></p>
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PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A expanding square search in St Louis 79 D, entering N 39 21' W 085 18', and use GPS.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**B Flight / Area B**

3. Discuss purpose of the flight:
  - a. How to plan and execute a expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT B Flight / Area B</b></p>
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B. EXPANDING SQUARE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**B Flight / Area B**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has a St. Louis sectional, a clipboard with blank paper, and an aeronautical protractor.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**B Flight / Area B**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search. The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

Proceed to Greensburg-Decatur Co. at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

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MISSION AIRCREW SCHOOL**

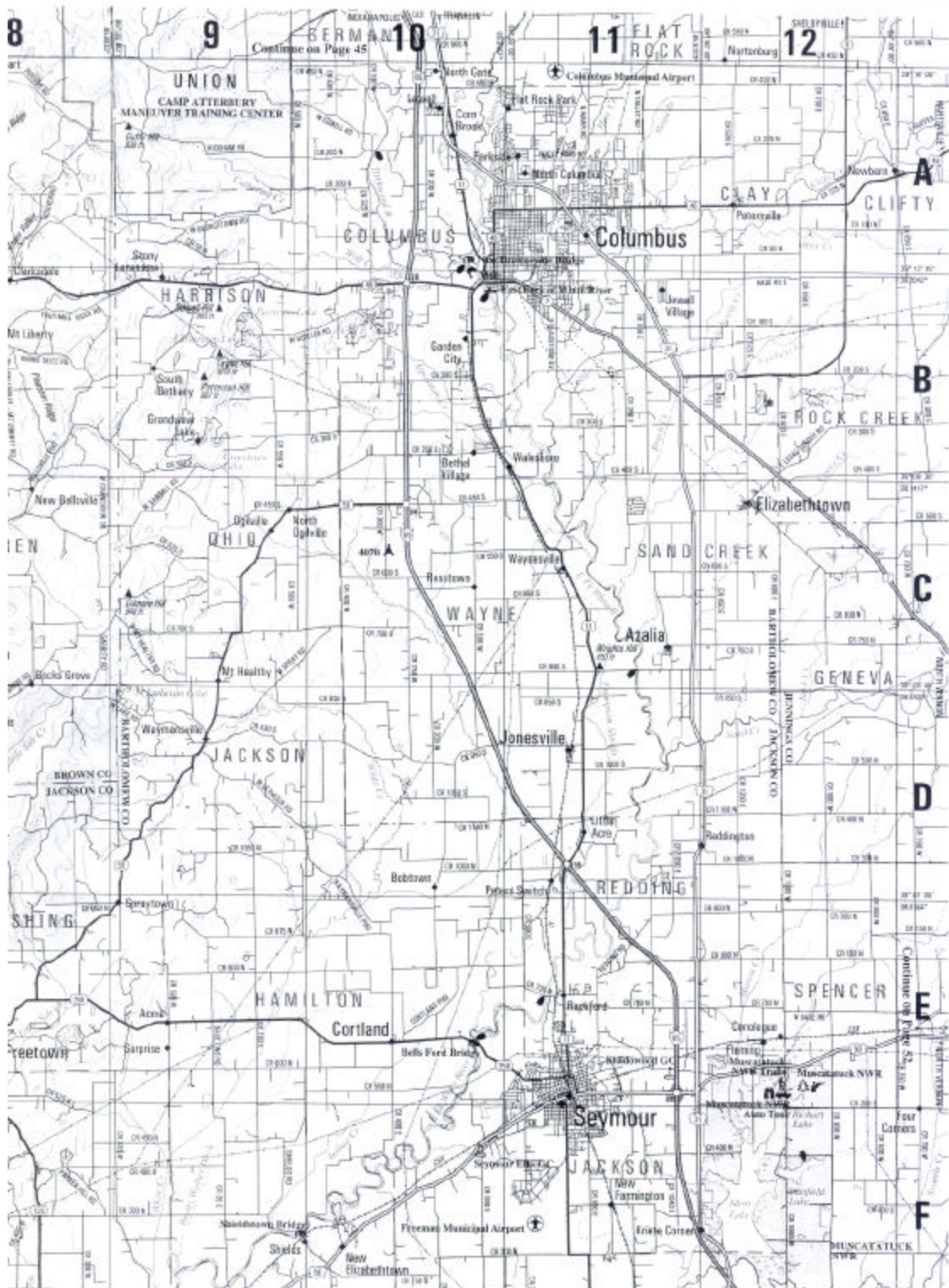
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT  
STUDENT  
B Flight / Area B**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee obtain ATIS information and then contact BAK Approach Control.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



**National Emergency Services Academy, CIVIL AIR PATROL**  
**Mission Aircrew School**  
**SCANNER TRAINING**  
**STUDENT**  
**C Flight / East Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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**C Flight / East Route**

- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### EAST / SOUTHEAST TRAINING TARGETS

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1     Power Plant     Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.     Bridge         Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

#### RETURN TO COLUMBUS (BAK)

<p>National Emergency Services Academy, CIVIL AIR PATROL Mission Aircrew School <b>SCANNER TRAINING</b> <b>STUDENT</b> <b>C Flight / East Route</b></p>
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1. Return via North Vernon, and point out landmarks and terrain features.
2. Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3. Grease the landing.

C. DEBRIEFING

1. Answer any questions.
2. Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3. Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4. Complete the 104.
5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

**National Emergency Services School, Civil Air Patrol  
Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
C Flight / Area C**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss purpose of the flight:
  - a. Locate the following communications equipment and discuss their use:
    - 1) Nav/Comms
    - 2) DME
    - 3) ADF
    - 4) GPS
    - 5) CAP radio
    - 6) Audio panel
    - 7) Intercom
    - 8) Push-to-talk pushbuttons and mike
  - b. Assist the pilot with radio aids:
    - 1) Set up radios (tower frequency)
    - 2) Obtaining taxi and takeoff clearances
    - 3) Mission Base reports (FM radio)
    - 4) Obtaining weather updates in-flight
    - 5) Pilot Weather Reports (PIREP)
  - c. Route search – See below for details
3. Initiate a 104.
4. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Observe operation of the communications and navigation equipment.
  - b. Contact BAK Tower (118.6) and give required information.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**National Emergency Services School, Civil Air Patrol**  
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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**C Flight / Area C**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn to heading 100 deg and using the Shelbyville VOR (112.0), perform the following tasks:
    - A. Verify the morse code.
    - B. Determine radial.
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to OVO.
    - F. Select OVO as destination in GPS.
    - G. Enter N 39° 12' W 085° 20' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using SHB and CVG VOR's and OVO NDB.

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Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
C Flight / Area C**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search of St Louis grids 106/107, entering at Napoleon Hence to Westport and Return.
2. Search should be conducted at 1000' AGL, 1 nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the inbound course from the exit point to the Greensburg-Decatur Co. airport.
6. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (121.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**C Flight / Area C**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 106 C, entering at the northeast corner, and use NS headings for ¼ grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the inbound course from the exit point to the CLIFS NDB.
7. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**C Flight / Area C**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**C Flight / Area C**

**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**C Flight / Area C**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search of 3mi legs northwest-bound from North Vernon N 39° 01' W 85° 39' (Hwy 7). At a minimum continue past the Scipio Bridge. Stop by Elizabethtown 39° 08'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the SHB VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**C Flight / Area C**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>C Flight / Area C</b></p>
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B. CREEPING LINE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE</b> <b>STUDENT</b> <b>C Flight / Area C</b></p>
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**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A expanding square search in St Louis 107D, entering at N 39 05' W 085, and use GPS.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts to 5 miles.
3. Determine the lat/long of the entry point. In addition, the entry point should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the inbound course from the exit point to the CLIFS NDB.
6. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**C Flight / Area C**

3. Discuss purpose of the flight:
  - a. How to plan and execute a expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT C Flight / Area C</b></p>
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B. EXPANDING SQUARE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**C Flight / Area C**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an St Louis sectional, a clipboard with blank paper, and an aeronautical protractor.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**C Flight / Area C**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search. The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

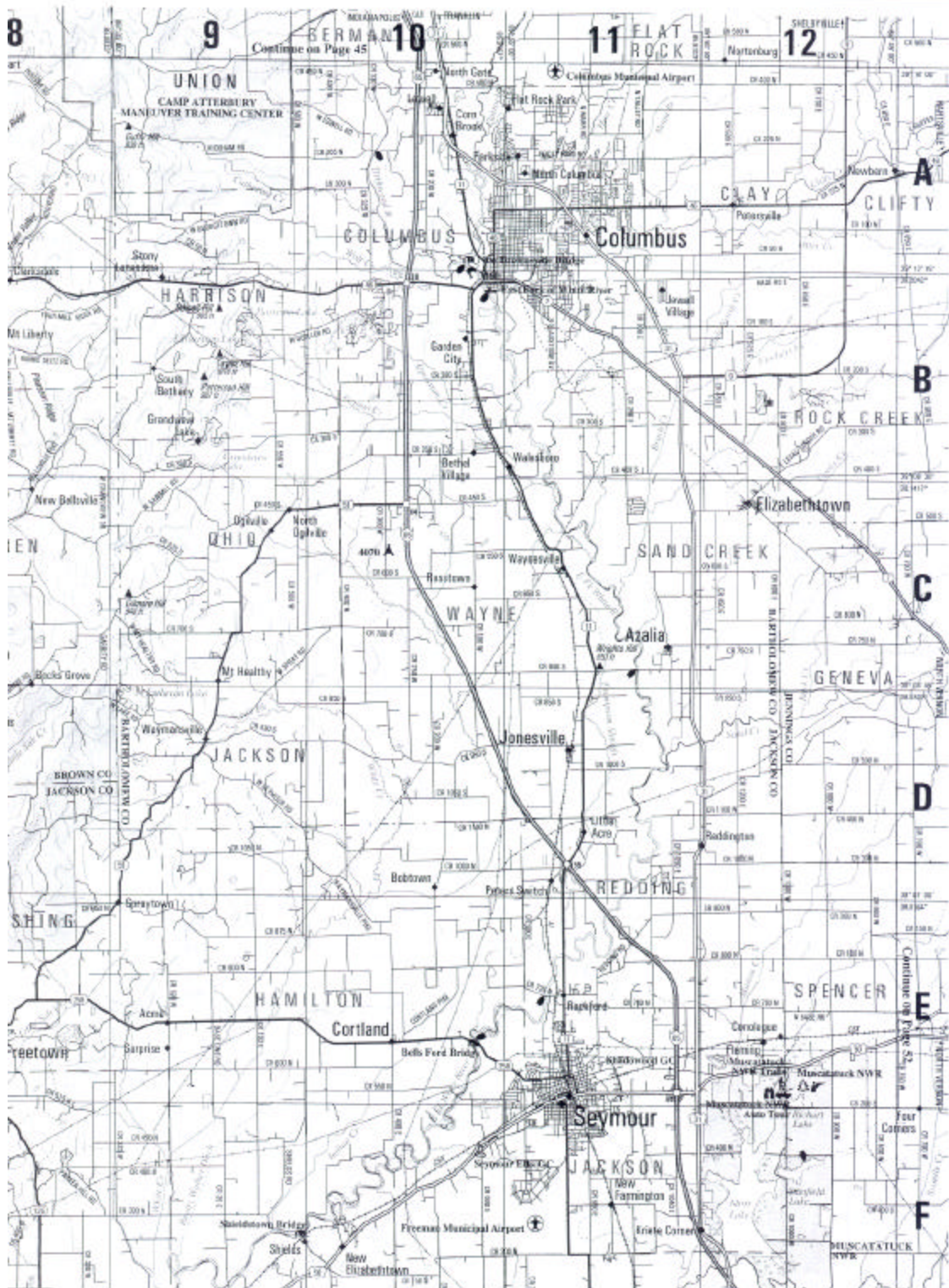
**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**C Flight / Area C**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to AMA, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee obtain ATIS information and then contact AMA Approach Control.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



**National Emergency Services Academy, CIVIL AIR PATROL**  
**Mission Aircrew School**  
**SCANNER TRAINING**  
**STUDENT**  
**D Flight / West Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

**National Emergency Services Academy, CIVIL AIR PATROL**  
**Mission Aircrew School**  
**SCANNER TRAINING**  
**STUDENT**  
**D Flight / West Route**

- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

**National Emergency Services Academy, CIVIL AIR PATROL**  
**Mission Aircrew School**  
**SCANNER TRAINING**  
**STUDENT**  
**D Flight / West Route**

*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Tower, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the Monroe Bridge on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

<p align="center"> <b>National Emergency Services Academy, CIVIL AIR PATROL</b>  <b>Mission Aircrew School</b>  <b>SCANNER TRAINING</b>  <b>STUDENT</b>  <b>D Flight / West Route</b> </p>
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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### EAST / SOUTHEAST TRAINING TARGETS

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1     Power Plant     Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.     Bridge         Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

#### RETURN TO COLUMBUS (BAK)

<p><b>National Emergency Services Academy, CIVIL AIR PATROL</b> <b>Mission Aircrew School</b> <b>SCANNER TRAINING</b> <b>STUDENT</b> <b>D Flight / West Route</b></p>
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1. Return via North Vernon, and point out landmarks and terrain features.
2. Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3. Grease the landing.

**C. DEBRIEFING**

1. Answer any questions.
2. Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3. Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4. Complete the 104.
5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

**National Emergency Services School, Civil Air Patrol**  
**Mission Aircrew School**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**D Flight / Area D**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss purpose of the flight:
  - a. Locate the following communications equipment and discuss their use:
    - 1) Nav/Comms
    - 2) DME
    - 3) ADF
    - 4) GPS
    - 5) CAP radio
    - 6) Audio panel
    - 7) Intercom
    - 8) Push-to-talk pushbuttons and mike
  - b. Assist the pilot with radio aids:
    - 1) Set up radios (tower frequency)
    - 2) Obtaining taxi and takeoff clearances
    - 3) Mission Base reports (FM radio)
    - 4) Obtaining weather updates in-flight
    - 5) Pilot Weather Reports (PIREP)
  - c. Route search – See below for details
3. Initiate a 104.
4. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Observe operation of the communications and navigation equipment.
  - b. Contact BAK Tower (118.6) and give required information.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**National Emergency Services School, Civil Air Patrol  
Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
D Flight / Area D**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn South towards NABB VOR (112.4) and perform the following tasks:
    - A. Verify the morse code.
    - B. Determine radial (335°).
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to SER.
    - E. Use GPS nearest airport feature to determine heading / distance to GEZ.
    - F. Select SER as destination in GPS.
    - G. Enter N 38° 48' W 085° 39' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using NABB and OOM.

**National Emergency Services School, Civil Air Patrol  
Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
D Flight / Area D**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search of St Louis I34, entering VR619 @ I65 NE Bound.
2. Search should be conducted at 1000' AGL, 1 nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the inbound course from the exit point to the NABB VOR.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the grid area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL  
MISSION AIRCREW SCHOOL  
OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID  
STUDENT  
D Flight / Area D**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 134C, entering at the northeast corner, and use NS headings for  $\frac{1}{4}$  grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the NABB VOR.
7. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**D Flight / Area D**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**D Flight / Area D**

**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**D Flight / Area D**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search Southwest-bound from St Road 7 & VR619 N 38° 55.5' W 85° 33'. At a minimum continue past the I-65. Stop by Rothersville 85° 50'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the NABB VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**D Flight / Area D**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**D Flight / Area D**

**B. CREEPING LINE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**D Flight / Area D**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A expanding square search in St Louis 134C, entering North, and use GPS.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the inbound course from the exit point to the NABB VOR.
6. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**D Flight / Area D**

3. Discuss purpose of the flight:
  - a. How to plan and execute a expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT D Flight / Area D</b></p>
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B. EXPANDING SQUARE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**D Flight / Area D**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft. Not in Indiana A/C
9. Ensure that the trainee has an STL sectional, a clipboard with blank paper, and an aeronautical protractor.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**D Flight / Area D**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search. The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

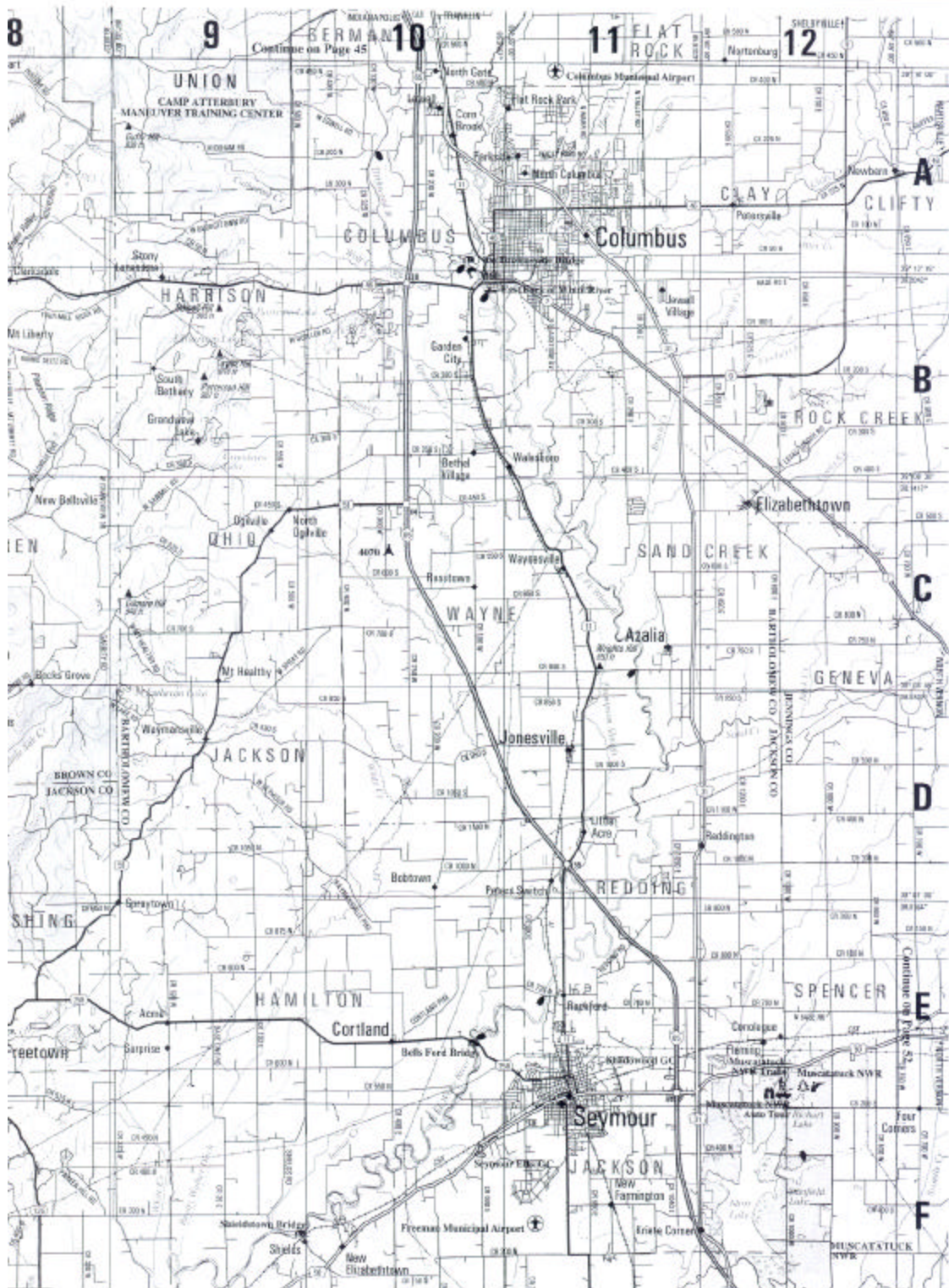
**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**D Flight / Area D**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee obtain ATIS information and then contact BAK Approach Control.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



**National Emergency Services Academy, CIVIL AIR PATROL**  
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**SCANNER TRAINING**  
**STUDENT**  
**E Flight / East Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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**E Flight / East Route**

- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### EAST / SOUTHEAST TRAINING TARGETS

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1     Power Plant     Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.     Bridge         Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

#### RETURN TO COLUMBUS (BAK)

<p>National Emergency Services Academy, CIVIL AIR PATROL Mission Aircrew School <b>SCANNER TRAINING</b> <b>STUDENT</b> <b>E Flight / East Route</b></p>
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1. Return via North Vernon, and point out landmarks and terrain features.
2. Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3. Grease the landing.

C. DEBRIEFING

1. Answer any questions.
2. Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3. Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4. Complete the 104.
5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

**National Emergency Services School, Civil Air Patrol**  
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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**E Flight / Area E**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss purpose of the flight:
  - a. Locate the following communications equipment and discuss their use:
    - 1) Nav/Comms
    - 2) DME
    - 3) ADF
    - 4) GPS
    - 5) CAP radio
    - 6) Audio panel
    - 7) Intercom
    - 8) Push-to-talk pushbuttons and mike
  - b. Assist the pilot with radio aids:
    - 1) Set up radios (tower frequency)
    - 2) Obtaining taxi and takeoff clearances
    - 3) Mission Base reports (FM radio)
    - 4) Obtaining weather updates in-flight
    - 5) Pilot Weather Reports (PIREP)
  - c. Route search – See below for details
3. Initiate a 104.
4. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Observe operation of the communications and navigation equipment.
  - b. Contact BAK Tower (118.6) and give required information.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
E Flight / Area E**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn north towards Shelbyville VOR (112.0) and perform the following tasks:
    - A. Verify the morse code.
    - B. Determine radial (188°).
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to GEZ.
    - F. Select GEZ as destination in GPS.
    - G. Enter N 39° 22' W 48° 46' as a waypoint, fly to it, and describe the nearest landmark (Norristown).
    - H. Write down cross-radials at this point using SHB and OOM (179° and 070°).

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
E Flight / Area E**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search of St Louis ----, entering at the ----.
2. Search should be conducted at 1000' AGL, 1 nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**E Flight / Area E**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 131B, entering at the northeast corner, and use NS headings for ¼ grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**E Flight / Area E**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**E Flight / Area E**

**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>E Flight / Area E</b></p>
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**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search northwest-bound from North Vernon N 39° 01' W 85° 39' (Hwy 7). At a minimum continue past the Scipio Bridge. Stop by Elizabethtown 39° 08'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the OOM VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**E Flight / Area E**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>E Flight / Area E</b></p>
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B. CREEPING LINE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT E Flight / Area E</b></p>
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**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A expanding square search in St Louis 131 D, starting over Heltonville, and use last NTAP.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**E Flight / Area E**

3. Discuss purpose of the flight:
  - a. How to plan and execute a expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT E Flight / Area E</b></p>
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B. EXPANDING SQUARE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross-radial and GPS lat/long position onto the sectional chart.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**E Flight / Area E**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an STL sectional, a clipboard with blank paper, and an aeronautical protractor.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**E Flight / Area E**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search. The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

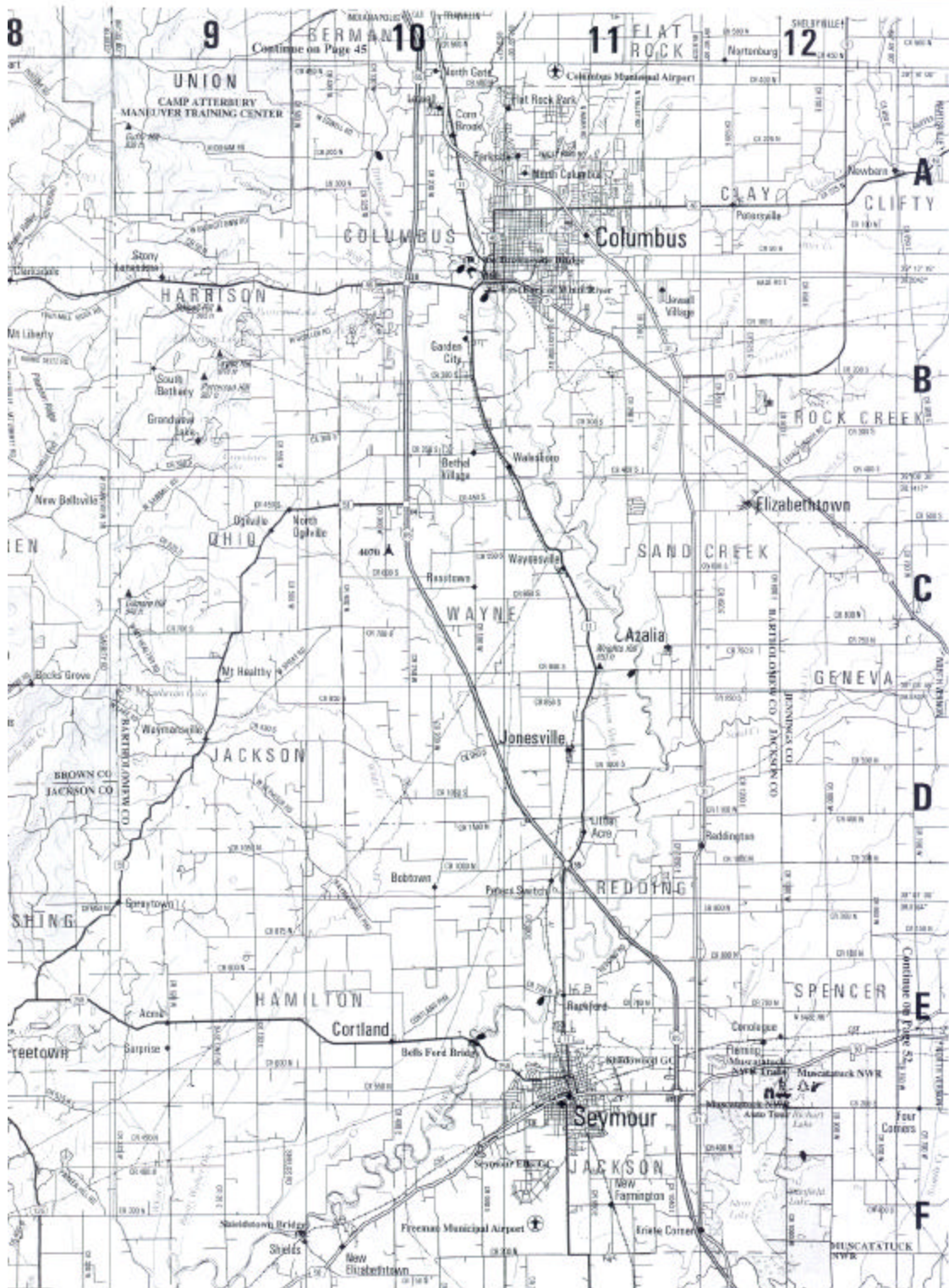
**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**E Flight / Area E**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to AMA, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee contact BAK Tower.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



**National Emergency Services Academy, CIVIL AIR PATROL**  
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**SCANNER TRAINING**  
**STUDENT**  
**F Flight / West Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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**SCANNER TRAINING**  
**STUDENT**  
**F Flight / West Route**

- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### C.     DEBRIEFING

1.     Answer any questions.
2.     Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3.     Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4.     Complete the 104.

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**F Flight / West Route**

5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

**National Emergency Services School, Civil Air Patrol  
Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
F Flight / Area F**

- A. PRE-FLIGHT BRIEFING
  - 1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
  - 2. Discuss purpose of the flight:
    - a. Locate the following communications equipment and discuss their use:
      - 1) Nav/Comms
      - 2) DME
      - 3) ADF
      - 4) GPS
      - 5) CAP radio
      - 6) Audio panel
      - 7) Intercom
      - 8) Push-to-talk pushbuttons and mike
    - b. Assist the pilot with radio aids:
      - 1) Set up radios (tower frequency)
      - 2) Obtaining taxi and takeoff clearances
      - 3) Mission Base reports (FM radio)
      - 4) Obtaining weather updates in-flight
      - 5) Pilot Weather Reports (PIREP)
    - c. Route search – See below for details
  - 3. Initiate a 104.
  - 4. Have the observer trainee give the aircraft passenger and safety briefing:
    - a. Demonstrate use of safety belts and harnesses
    - b. Identify emergency exits
  - 5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
    - a. Observe operation of the communications and navigation equipment.
    - b. Contact BAK Tower (118.6) and give required information.
    - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

National Emergency Services School, Civil Air Patrol  
Mission Aircrew School  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**F Flight / Area F**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn north towards Shelbyville VOR (SHB) and perform the following tasks:
    - A. Verify the Morse code.
    - B. Determine radial.
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to MQJ.
    - F. Select MQJ as destination in GPS.
    - G. Enter N 39° 39' W085° 59' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using SHB and OOM.

<p style="text-align: center;">National Emergency Services School, Civil Air Patrol Mission Aircrew School <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO &amp; ROUTE</b> <b>STUDENT</b> <b>F Flight / Area F</b></p>
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**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search to Shelbyville
  - a. Depart BAK
  - b. Direct MQJ (Mt Comfort)
  - c. Start search direct GEZ (Shelbyville)
  - d. Return BAK
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the outbound course from MQJ to GEZ.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL  
MISSION AIRCREW SCHOOL  
OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID  
STUDENT  
F Flight / Area F**

### PRE-EXERCISE PLANNING

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 22D, entering at the northeast corner, and use NS headings for  $\frac{1}{4}$  grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

### A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**F Flight / Area F**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID</b> <b>STUDENT</b> <b>F Flight / Area F</b></p>
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**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>F Flight / Area F</b></p>
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#### PRE-EXERCISE PLANNING

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search east bound from Mohawk N39° 51' W085° 51' to Charlottesville N39° 47' W085° 37'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the SHB VOR.
8. Mark your sectional accordingly.

#### A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**F Flight / Area F**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>F Flight / Area F</b></p>
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B. CREEPING LINE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT F Flight / Area F</b></p>
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## PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. An expanding square search in St Louis 22A starting at N39° 58' W085° 41'.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

## A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**STUDENT**  
**F Flight / Area F**

3. Discuss purpose of the flight:
  - a. How to plan and execute an expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT F Flight / Area F</b></p>
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B. EXPANDING SQUARE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**F Flight / Area F**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. En route
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).  
(N39° 52' W085° 56' & N39° 50' W085° 52')
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an St Louis sectional, a clipboard with blank paper, and an aeronautical protractor.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**F Flight / Area F**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

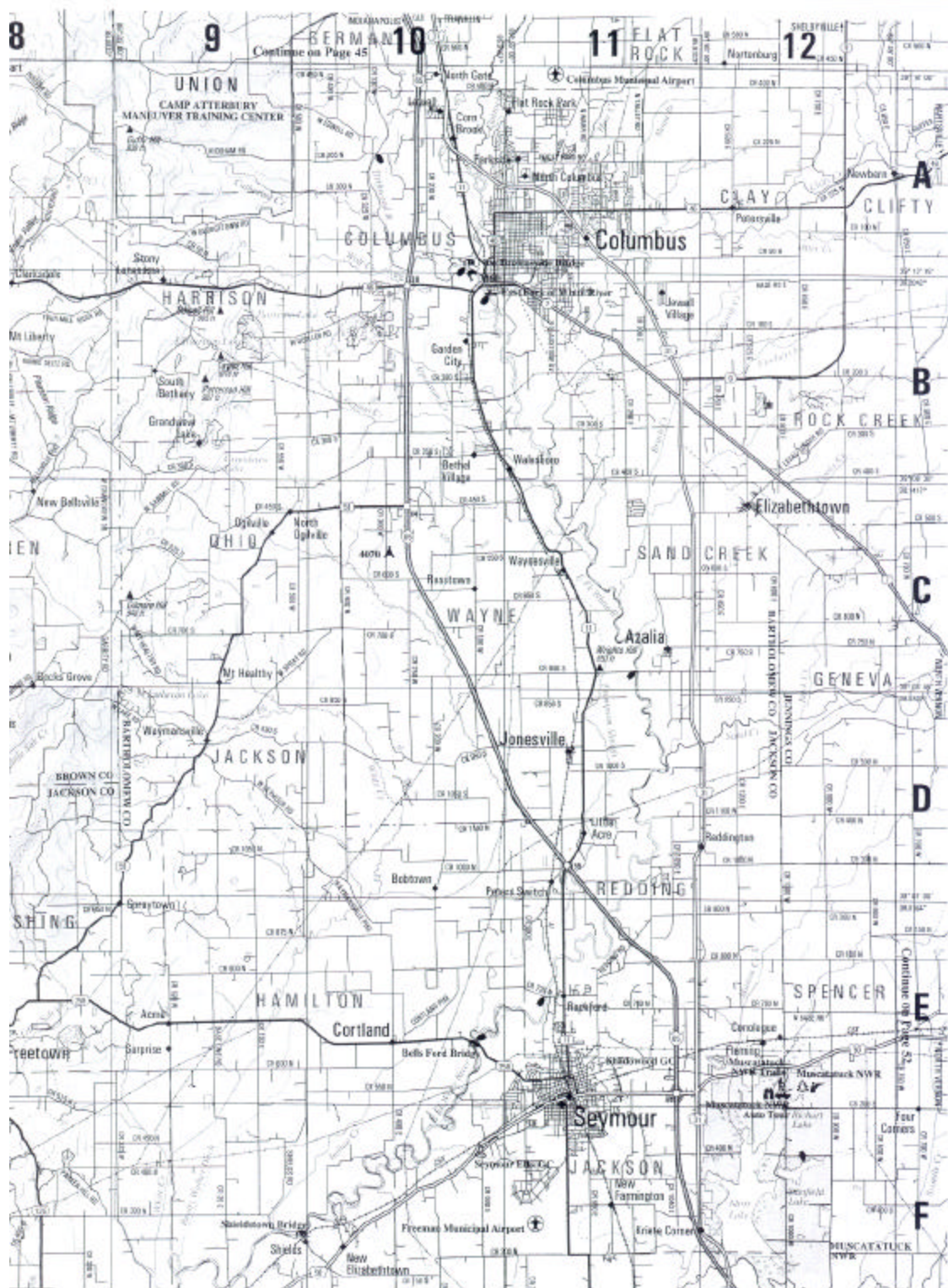
**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**F Flight / Area F**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee contact BAK Tower.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



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**G Flight / East Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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**G Flight / East Route**

- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### EAST / SOUTHEAST TRAINING TARGETS

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1     Power Plant     Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.     Bridge         Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

#### RETURN TO COLUMBUS (BAK)

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1. Return via North Vernon, and point out landmarks and terrain features.
2. Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3. Grease the landing.

**C. DEBRIEFING**

1. Answer any questions.
2. Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3. Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4. Complete the 104.
5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
G Flight / Area G**

- A. PRE-FLIGHT BRIEFING
  - 1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
  - 2. Discuss purpose of the flight:
    - a. Locate the following communications equipment and discuss their use:
      - 1) Nav/Comms
      - 2) DME
      - 3) ADF
      - 4) GPS
      - 5) CAP radio
      - 6) Audio panel
      - 7) Intercom
      - 8) Push-to-talk pushbuttons and mike
    - b. Assist the pilot with radio aids:
      - 1) Set up radios (tower frequency)
      - 2) Obtaining taxi and takeoff clearances
      - 3) Mission Base reports (FM radio)
      - 4) Obtaining weather updates in-flight
      - 5) Pilot Weather Reports (PIREP)
    - c. Route search – See below for details
  - 3. Initiate a 104.
  - 4. Have the observer trainee give the aircraft passenger and safety briefing:
    - a. Demonstrate use of safety belts and harnesses
    - b. Identify emergency exits
  - 5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
    - a. Observe operation of the communications and navigation equipment.
    - b. Contact BAK Tower (118.6) and give required information.
    - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**G Flight / Area G**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn north towards Shelbyville VOR and perform the following tasks:
    - A. Verify the Morse code.
    - B. Determine radial.
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to UWL.
    - F. Select UWL as destination in GPS.
    - G. Enter N 39° 36' W085° 28' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using SHB and RID.

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
G Flight / Area G**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search to Mettel.
  - a. Depart BAK
  - b. Direct UWL (New Castle-Henry Co.)
  - c. Start search direct CEV (Mettel)
  - d. Return direct BAK
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the outbound course from UWL to CEV.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL  
MISSION AIRCREW SCHOOL  
OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID  
STUDENT  
G Flight / Area G**

### PRE-EXERCISE PLANNING

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 23D, entering at the northeast corner, and use NS headings for  $\frac{1}{4}$  grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

### A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**G Flight / Area G**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID</b> <b>STUDENT</b> <b>G Flight / Area G</b></p>
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**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL  
MISSION AIRCREW SCHOOL  
OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE  
STUDENT  
G Flight / Area G**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search north bound from Spiceland N39° 50' W085° 27' to Cadiz N39° 57' W085° 29'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the SHB VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**G Flight / Area G**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>G Flight / Area G</b></p>
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B. CREEPING LINE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT G Flight / Area G</b></p>
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## PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. An expanding square search in St Louis 23D starting at N39° 48' W085° 20'.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

## A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**G Flight / Area G**

3. Discuss purpose of the flight:
  - a. How to plan and execute an expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT G Flight / Area G</b></p>
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**B. EXPANDING SQUARE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**G Flight / Area G**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. En route
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).  
(N39° 55' W085° 22' & N39° 50' W085° 23')
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an St Louis sectional, a clipboard with blank paper, and an aeronautical protractor.

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STUDENT  
G Flight / Area G**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

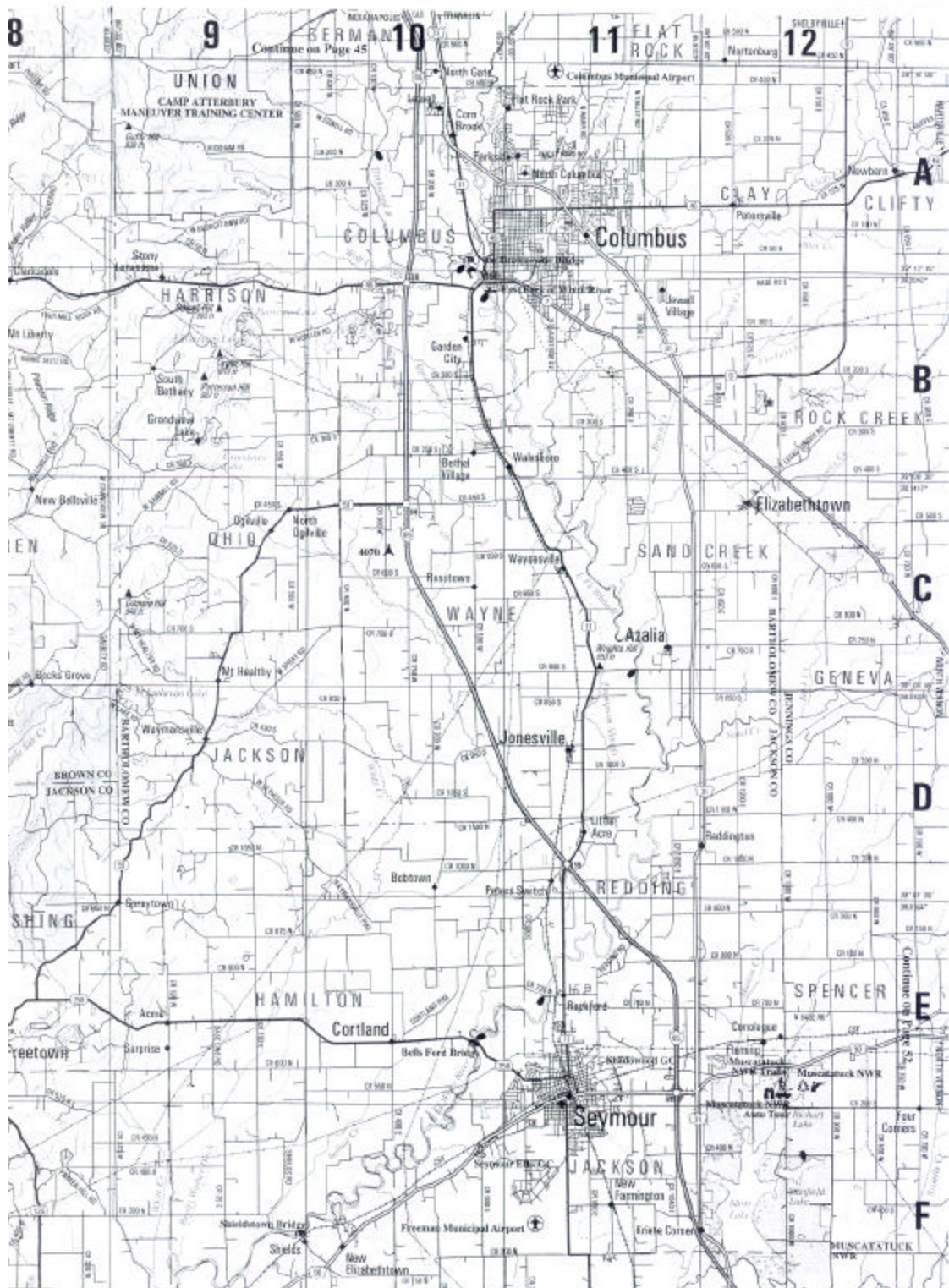
**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**G Flight / Area G**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee contact BAK Tower.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



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**H Flight / West Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### C.     DEBRIEFING

1.     Answer any questions.
2.     Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3.     Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4.     Complete the 104.

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5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

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Mission Aircrew School  
OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
H Flight / Area H**

- A. PRE-FLIGHT BRIEFING
  - 1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
  - 2. Discuss purpose of the flight:
    - a. Locate the following communications equipment and discuss their use:
      - 1) Nav/Comms
      - 2) DME
      - 3) ADF
      - 4) GPS
      - 5) CAP radio
      - 6) Audio panel
      - 7) Intercom
      - 8) Push-to-talk pushbuttons and mike
    - b. Assist the pilot with radio aids:
      - 1) Set up radios (tower frequency)
      - 2) Obtaining taxi and takeoff clearances
      - 3) Mission Base reports (FM radio)
      - 4) Obtaining weather updates in-flight
      - 5) Pilot Weather Reports (PIREP)
    - c. Route search – See below for details
  - 3. Initiate a 104.
  - 4. Have the observer trainee give the aircraft passenger and safety briefing:
    - a. Demonstrate use of safety belts and harnesses
    - b. Identify emergency exits
  - 5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
    - a. Observe operation of the communications and navigation equipment.
    - b. Contact BAK Tower (118.6) and give required information.
    - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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Mission Aircrew School  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**H Flight / Area H**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn north towards Shelbyville VOR (112.0) and perform the following tasks:
    - A. Verify the Morse code.
    - B. Determine radial.
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to CEV.
    - F. Select CEV as destination in GPS.
    - G. Enter N39° 25' W085° 29' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using SHB and RID.

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
H Flight / Area H**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search to Greensburg-Decatur Co.
  - a. Depart BAK
  - b. Direct CEV (Mettel)
  - c. Start search direct I34 (Greensburg-Decatur Co.)
  - d. Return direct BAK
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the outbound course from CEV to I34.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

<p><b>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL</b> <b>MISSION AIRCREW SCHOOL</b> <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID</b> <b>STUDENT</b> <b>H Flight / Area H</b></p>
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## PRE-EXERCISE PLANNING

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 51D, entering at the northeast corner, and use NS headings for  $\frac{1}{4}$  grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

## A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**H Flight / Area H**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID</b> <b>STUDENT</b> <b>H Flight / Area H</b></p>
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**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**H Flight / Area H**

**PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search east bound from New Salem N39° 33' W085° 22' to Andersonville N39° 30' W085° 11'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the SHB VOR.
8. Mark your sectional accordingly.

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**STUDENT**  
**H Flight / Area H**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>H Flight / Area H</b></p>
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**B. CREEPING LINE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT H Flight / Area H</b></p>
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## PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. An expanding square search in St Louis 51D starting at N39° 34' W085° 20'.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the SHB VOR.
7. Mark your sectional accordingly.

## A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**H Flight / Area H**

3. Discuss purpose of the flight:
  - a. How to plan and execute an expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT H Flight / Area H</b></p>
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**B. EXPANDING SQUARE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**H Flight / Area H**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. En route
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).  
(N39° 44' W085° 10' & N39° 40' W085° 05')
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an St Louis sectional, a clipboard with blank paper, and an aeronautical protractor.

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**STUDENT**  
**H Flight / Area H**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search. The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).*

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

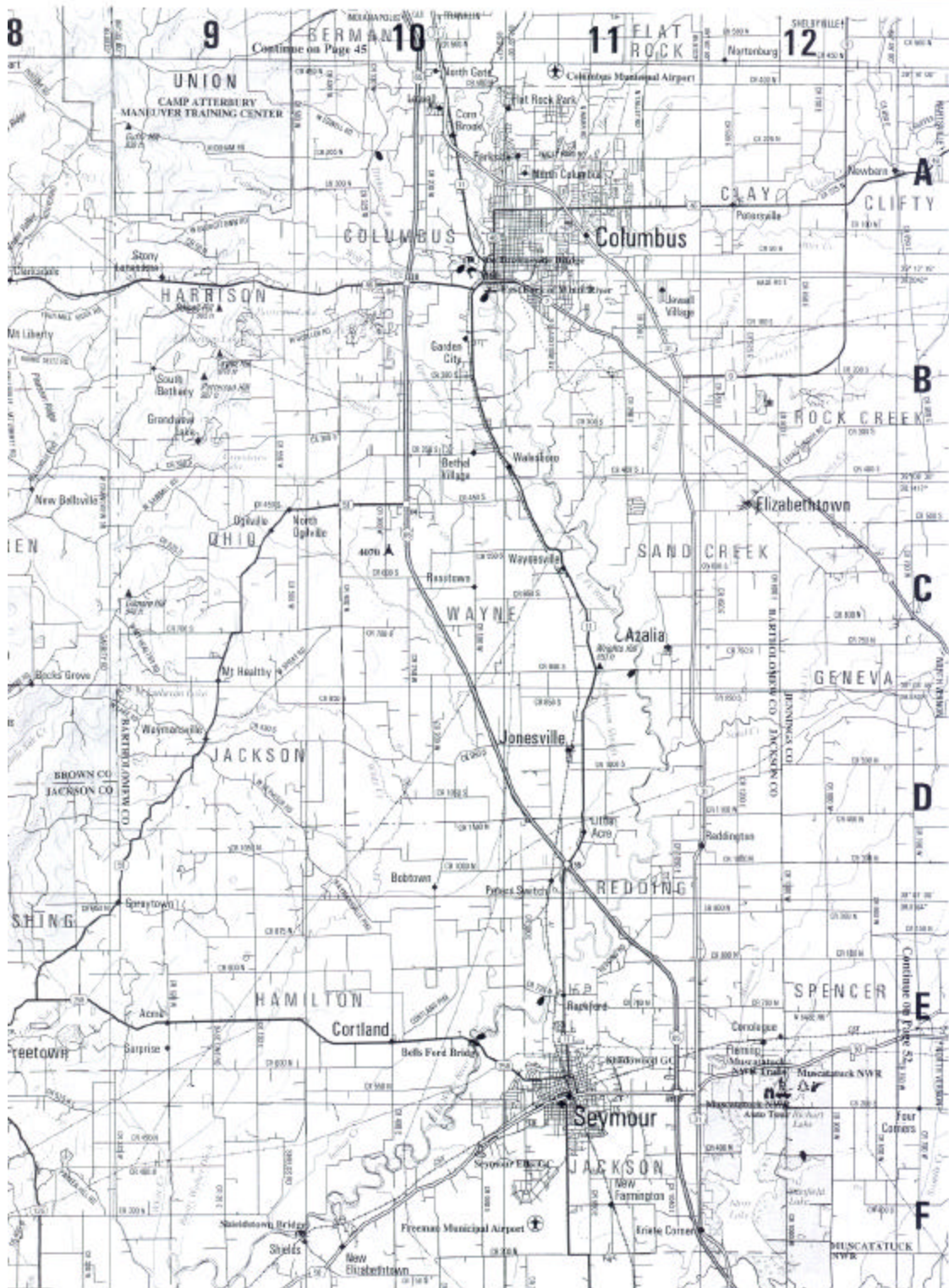
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**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**H Flight / Area H**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee contact BAK Tower.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.



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**I Flight / East Route**

**A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Discuss how the scanner watches for other aircraft during departure, cruise, and approach.
3. Have the trainee discuss the scanner's duties during:
  - a. Departure
  - b. Enroute
  - c. Approach and landing
4. Discuss purpose of the flight:
  - a. How objects on the ground look from the air at different heights and speeds, including:
    - 1) Angular displacement and aircraft motion effects on surface coverage (fixation area)
    - 2) Difference between scanning range and search visibility ranges
  - b. Common obstacles to flight (e.g., towers and guy wires, buildings, power lines).
  - c. Scanning techniques:
    - 1) Use of diagonal and vertical scanning patterns from both sides of the aircraft
    - 2) Identification of visual clues
  - d. Search effectiveness factors:
    - 1) Position of the sun (time of day)
    - 2) Atmospheric conditions (haze, dust, water vapor, bright sun)
    - 3) Clouds and shadows
    - 4) Terrain and ground cover
    - 5) Condition of the scanner (fatigue, illness)
    - 6) Aircraft height above ground
    - 7) Aircraft speed
    - 8) Cleanliness of windows
    - 9) Use of binoculars
  - e. Use of sectional and maps to identify positions and objects on the ground.
  - f. How to locate people and vehicles on the ground.

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- g. How various factors affect your ability to locate and identify people on the ground (e.g., victim's position & clothing, terrain).
- h. Emergency signals that may be used by victims:
  - 1) Fire and/or smoke
  - 2) Signal mirrors
  - 3) Panels on the ground
  - 4) Messages on the ground
  - 5) Light signals (primarily nighttime)
- i. How to communicate with victims on the ground (e.g., drops, aircraft movements, and radio)
- j. Factors affecting probability of detection (use POD chart on the 104):
  - 1) Meteorological, search, and scanning visibility
  - 2) Type of terrain
  - 3) Ground track of the aircraft
  - 4) Search track (scanning range and ground track)
  - 5) Track spacing
  - 6) Possibility and probability areas
  - 7) Search altitude and speed
- 5. Initiate a 104.
- 6. Give the trainee a clipboard, a sectional chart, and a map. Discuss the differences in detail between the sectional and the map. With assistance, the trainee will follow the route and locate major land features on both the sectional chart and the map. *Just as importantly, the trainee will see what is not shown on the sectional chart and map.* Discuss using GPS coordinates to locate points on the chart and map; also discuss use of VOR radials for locating a point on the sectional.
- 7. Aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
- 8. Aircraft survival equipment:
  - a. Locate the ELT and its antenna, discuss manual activation
  - b. Demonstrate use of all radios
  - c. Go through contents of the survival kit
- B. PROCEED TO TRAINING TARGETS

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*During the flight, the trainee should spend most of the time looking outside the airplane.* Enroute to the first target, fly at cruise speed 90-100 KIAS. Upon reaching a suitable point in the city, do a circling climb to 2000' AGL and then point out the differences (especially in the size of people and cars). Proceed to first target and establish 1000' AGL at 90-100 kts.

At the tank farm demonstrate how aircraft speed affects search effectiveness. Demonstrate a steep turn around the target. Also, let the trainee experiment with the binoculars (discuss what to do to prevent or mitigate the effects of airsickness and vertigo).

*During the flight, the trainee will spend most of the time looking outside the airplane and then associating major landmarks with what appears on the sectional chart.* Discuss what to look for during a route search. Upon reaching Target #1, circle one of the towers at 2000' AGL and point out the guy wires, markings, and lights.

On longer sections of the route cruise at 2000 AGL at 100 KIAS.

At Target #5, have the trainee locate the tank farm on both the sectional and the map. Then let the trainee draw a map of the dam on the clipboard with sufficient detail to direct a ground team to the dam.

Whenever possible, point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
- Smoke and fire
- Blackened areas
- Local discoloration of foliage
- Fresh bare earth
- Breaks in cultivated field patterns
- Water and snow
- Tracks and signals
- Birds and animals

1.     Towers           South Southwest of Columbus (BAK) on both sides of the river.
2.     Closed Air  
       Port           7 Miles south of Columbus (BAK) and east of the river.
3.                    Proceed south along the river
4.     River           Point out the rail road tracks, power transmission lines & other

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items of interest

5.     Tank Farm     14.2 NM south of Columbus (BAK) along the river
6.     Towers         North of Seymour

#### WEST TRAINING TARGETS

Proceed direct to Lake Monroe Bridge located 10 miles Southeast of Monroe County (BMG). Crossing low hills Northwest of Seymour, demonstrate high and low altitude changes 2000, 1000 and 500 AGL in relation to hilly country.

1.     Bridge         Circle bridge at 2000, 1000 and 500 while discussing damage assessment.

#### RETURN TO COLUMBUS (BAK)

1.     While retuning to BAK point out landmarks and terrain features.
2.     Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3.     Grease the landing.

#### EAST / SOUTHEAST TRAINING TARGETS

Climb to 2000 AGL to Madison (IMS). Fly over Muscatatuck National Wildlife Refuge

- 1     Power Plant     Circle smoke stacks, and identify strobes and transmission lines crossing the Ohio River. Discuss damage assessment.
2.     Bridge         Continue east along the north bank of the Ohio River to the bridge. Do not cross to the south side. Circle the north half of the bridge at 2000, 1000 and 500 AGL, and discuss damage assessment.

#### RETURN TO COLUMBUS (BAK)

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1. Return via North Vernon, and point out landmarks and terrain features.
2. Discuss the approach and landing phases of flight. The intent is to familiarize the trainee with how an aircraft approaches an airport. Discuss the fact that many aircraft accidents occur within 5-10 miles of the airport, and show the trainee where one would look when near an airport during a search.
3. Grease the landing.

**C. DEBRIEFING**

1. Answer any questions.
2. Go over notes and the drawing. Critique the map as if you were a ground team leader being sent to the target. Have the trainee complete the 104, including transferring the clipboard drawing onto the 104.
3. Ask the trainee some questions on the information contained on their sectional chart. Encourage the trainee to become thoroughly familiar with the sectional.
4. Complete the 104.
5. Sign the trainee's qualification card or 101-T.
6. Give the trainee a copy of the ground-to-air signals handout to keep. Emphasize that the next flight requires knowledge of the signals.
7. Give the trainee an old sectional chart to keep. Show the trainee how to use a sectional, including the legends. Emphasize that the next flight requires use of the sectional.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**I Flight / Area I**

- A. PRE-FLIGHT BRIEFING
1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
  2. Discuss purpose of the flight:
    - a. Locate the following communications equipment and discuss their use:
      - 1) Nav/Comms
      - 2) DME
      - 3) ADF
      - 4) GPS
      - 5) CAP radio
      - 6) Audio panel
      - 7) Intercom
      - 8) Push-to-talk pushbuttons and mike
    - b. Assist the pilot with radio aids:
      - 1) Set up radios (tower frequency)
      - 2) Obtaining taxi and takeoff clearances
      - 3) Mission Base reports (FM radio)
      - 4) Obtaining weather updates in-flight
      - 5) Pilot Weather Reports (PIREP)
    - c. Route search – See below for details
  3. Initiate a 104.
  4. Have the observer trainee give the aircraft passenger and safety briefing:
    - a. Demonstrate use of safety belts and harnesses
    - b. Identify emergency exits
  5. Assist the trainee in setting up the proper communications frequencies for the CAP radio, DF, and tower. Enter the proper nav/comm frequencies, enter first destination in the GPS. Demonstrate setup of the audio panel. Then have the trainee:
    - a. Observe operation of the communications and navigation equipment.
    - b. Contact BAK Tower (118.6) and give required information.
    - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

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**OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE**  
**STUDENT**  
**I Flight / Area I**

**B. DEPARTURE, IN-ROUTE, APPROACH & LANDING COMMUNICATIONS**

*During the flight, the trainee should concentrate on learning to use the aircraft radios, (including the CAP radio), and navigation equipment (VOR, DME, ADF, and GPS).*

1. Enroute to the search entry point, fly at 100 KIAS and 3000 MSL. Discuss what to look for during a route or parallel track search.

Whenever possible, have the trainee point out objects on the ground which resemble search visual clues, such as:

- Light colored or shiny objects
  - Smoke and fire
  - Blackened areas
  - Local discoloration of foliage
  - Fresh bare earth
  - Breaks in cultivated field patterns
  - Water and snow
  - Tracks and signals
  - Birds and animals
2. Upon reaching the edge of class D airspace have the trainee report entering the search route. Have the trainee follow the route on both sectional and the Hwy or DeLorme map.
  3. Turn south towards NABB VOR (112.4) and perform the following tasks:
    - A. Verify the Morse code.
    - B. Determine radial.
    - C. Select on GPS and compare heading.
    - D. Select on DME and compare heading and distance to GPS.
    - E. Use GPS nearest airport feature to determine heading / distance to I83.
    - F. Select I83 as destination in GPS.
    - G. Enter N38° 56' W085° 45' as a waypoint, fly to it, and describe the nearest landmark.
    - H. Write down cross-radials at this point using SHB and OOM.

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OBSERVER/MISSION PILOT TRAINING FLIGHT #1 INTRO & ROUTE  
STUDENT  
I Flight / Area I**

**C. ROUTE SEARCH**

This exercise requires that the trainee plan a route search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A route search to Freeman.
  - a. Depart BAK
  - b. Direct I83 (Salem)
  - c. Start search direct SER (Freeman)
  - d. Return direct BAK
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross-radials to the entry point.
6. Determine the outbound course from I83 to SER.
7. Mark your sectional accordingly.

**D. RETURN TO BAK**

1. Discuss anticipated communications with tower, and let the trainee handle communications during the approach and landing. Have the trainee report out of the area (edge of Class D or before) and wheels down.
2. Discuss anticipated taxi instructions, and let the trainee handle communications with ground control (118.6).

**E. DEBRIEFING**

1. Answer any questions.
2. Complete the 104.
3. Sign the trainee's qualification card or 101-T.

<p><b>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL</b> <b>MISSION AIRCREW SCHOOL</b> <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID</b> <b>STUDENT</b> <b>I Flight / Area I</b></p>
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## **PRE-EXERCISE PLANNING**

This exercise requires that the trainee plan a grid search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A grid search of St Louis 160B, entering at the northeast corner, and use NS headings for  $\frac{1}{4}$  grid.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the NABB VOR.
7. Mark your sectional accordingly.

## **A. PRE-FLIGHT BRIEFING**

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID**  
**STUDENT**  
**I Flight / Area I**

3. Discuss purpose of the flight:
  - a. How to plan and execute a grid search, with emphasis on navigational aids and the use of navigation equipment.
  - b. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - c. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - d. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL  
MISSION AIRCREW SCHOOL  
OBSERVER/MISSION PILOT TRAINING FLIGHT #2 GRID  
STUDENT  
I Flight / Area I**

**B. GRID SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the grid search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal grid search pattern (quarter grid), but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>I Flight / Area I</b></p>
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## PRE-EXERCISE PLANNING

This exercise requires that the trainee plan a creeping line search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. A creeping line search northeast bound from Campbellsburg N38° 39' W086° 16' to Bono N38° 44' W086° 20'.
2. Conduct at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the magnetic heading and distance (nm) from the exit point to BAK.
7. Determine the inbound course from the exit point to the NABB VOR.
8. Mark your sectional accordingly.

## A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE**  
**STUDENT**  
**I Flight / Area I**

3. Discuss purpose of the flight:
  - a. How to plan and execute a creeping line search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOTS TRAINING FLIGHT # 3 CREEPING LINE</b> <b>STUDENT</b> <b>I Flight / Area I</b></p>
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B. CREEPING LINE SEARCH

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Proceed to the entry point at 1000' AGL.
2. Let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.

C. RETURN TO BASE

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

D. DEBRIEFING

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

<p style="text-align: center;">NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT I Flight / Area I</b></p>
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## PRE-EXERCISE PLANNING

This exercise requires that the trainee plan an expanding square search prior to the exercise (i.e., homework). The trainee should use an St Louis sectional to plan this exercise. The trainee should have planned for:

1. An expanding square search in St Louis 160B starting at N38° 42' W086° 04'.
2. Search should be conducted at 1000' AGL, 1nm track spacing, and 90-100 kts.
3. Determine the lat/long of the entry and exit points. In addition, the entry and exit points should be fixed using VOR cross-radials.
4. Determine the magnetic heading and distance (nm) from BAK to the entry point.
5. Determine the VOR cross radials to the entry point.
6. Determine the inbound course from the exit point to the NABB VOR.
7. Mark your sectional accordingly.

## A. PRE-FLIGHT BRIEFING

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. Enroute
  - d. Approach and landing

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE**  
**STUDENT**  
**I Flight / Area I**

3. Discuss purpose of the flight:
  - a. How to plan and execute an expanding square search, with emphasis on navigational aids and the use of navigation equipment.
  - b. Locate the following navigational equipment and discuss their use:
    - 1) VOR
    - 2) ADF
    - 3) DME
    - 4) GPS
  - c. Assist the pilot with navigational aids:
    - 1) Setting and verifying proper frequencies for VOR, ADF, and DME
    - 2) Setup of audio panel pushbuttons
    - 3) Initial setup of the GPS
4. Discuss use of the GPS, VOR, and DME during searches.
5. Review the trainee's planning and correct as necessary.
6. Initiate a 104. Have the trainee enter the required information.
7. Have the observer trainee give the aircraft passenger and safety briefing:
  - a. Demonstrate use of safety belts and harnesses
  - b. Identify emergency exits
8. Have the trainee set up the proper communications frequencies for the CAP radio, DF, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Handle communications with clearance delivery/ground, tower, and departure control.
  - c. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

<p>NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL MISSION AIRCREW SCHOOL <b>OBSERVER/MISSION PILOT TRAINING FLIGHT #4 EXPANDING SQUARE STUDENT I Flight / Area I</b></p>
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**B. EXPANDING SQUARE SEARCH**

*During the flight, the trainee should concentrate on learning to use the aircraft navigational aids.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of secondary importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

1. Enroute to the expanding square search entry point, fly at cruise speed and 1000' AGL. Demonstrate operation of the ADF. Demonstrate use of the DME, VORs, and GPS when flying to the entry point.
2. Conduct a normal expanding square search pattern, but let the trainee verify proper tracking per ground reference and GPS. Have the trainee notify the pilot when its time to turn and in which direction to turn.
3. Have the trainee practice position determination by use of VOR cross-radials.
4. Have the trainee transfer a VOR cross radial and GPS lat/long position onto the sectional chart.

**C. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee handle communications with approach, tower, and ground control.

**D. DEBRIEFING**

1. Answer any questions.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.
4. Briefly discuss Observer Training Flight #3.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**I Flight / Area I**

**A. PRE-FLIGHT BRIEFING**

**NOTE:** The best training setting for ELT training is to have an observer trainee in the front right seat and a scanner trainee in the back seat. The scanner trainee should use the Scanner Training Flight #4 syllabus.

1. Sign in personnel, aircraft, and vehicles. Use mission flow chart [Pilot: Ensure that the beacon is on and that you know where it is located.]
2. Have the trainee discuss the observer's duties during:
  - a. Preflight and taxi
  - b. Departure
  - c. En route
  - d. ELT search.
  - e. Approach and landing
3. Discuss electronic search patterns (may refer to CAPP 2), including:
  - a. Altitude selection.
  - b. SARSAT information, including how to transfer the data to a sectional.
  - c. Basic operation of the DF, including signal strength and DF meters.
  - d. Signal null (wing block) method, using both the DF and COMM receivers.
4. Discuss use of the GPS, VOR, and DME during an ELT search.
5. Have the trainee transfer two SARSAT hits onto the sectional. Discuss how the search will be accomplished (use 2000' AGL).  
(N38° 38' W086° 10' & N38° 35' W086° 05')
6. Initiate a 104.
7. Show the trainee the DF equipment in the aircraft, including location of the DF and COMM antennas.
8. Show the trainee where CAPP 2 is located in the aircraft.
9. Ensure that the trainee has an St LouisL sectional, a clipboard with blank paper, and an aeronautical protractor.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**I Flight / Area I**

**B. PREFLIGHT AND TAXI**

1. Have the trainee set up the proper communications frequencies for the CAP radio, DF, ATIS, clearance delivery/ground, tower, and departure control. Demonstrate setup of the audio panel. Then have the trainee:
  - a. Set up the audio panel switches.
  - b. Obtain ATIS information.
  - c. Handle communications with clearance delivery/ground, tower, and departure control.
  - d. Give wheels up, time in the grid, time out of the grid, and wheels down reports.

**C. PROCEED TOWARD THE BEACON**

*During the flight, the trainee should concentrate on learning to use the aircraft DF equipment. Secondly, the trainee should use the aircraft navigational aids to support the electronic search.* The trainee should also handle as much of the communications load as practical during this exercise, but this is of least importance (however, the trainee should report wheels up, time in the grid, time out of the grid, and wheels down).

Proceed to the area at cruise speed. Climb to 2000' AGL and begin the search as soon as practical. The trainee should track the route on the sectional and be prepared to use the VORs and GPS to locate a position.

1. Conduct a normal electronic search pattern, keeping the trainee informed as to your actions. Discuss the observer's role in the search.
2. Give the trainee another position and heading to simulate a report from another aircraft involved in the search. Have the trainee determine current position and the heading to the beacon from this position. The trainee will then extend the headings on the sectional until they cross. Discuss this method of determining the possible location of an ELT.
3. Demonstrate the signal null (wing block) method. Coordinate with the observer trainee to determine headings to the beacon. The trainee should note the positions and headings on the sectional or on a sketch. Discuss this method of determining the possible location of an ELT.
4. Point out where the beacon is located. Have the trainee fix its position on the sectional and draw a sketch of the area.

**NATIONAL EMERGENCY SERVICES ACADEMY, CIVIL AIR PATROL**  
**MISSION AIRCREW SCHOOL**  
**OBSERVER/MISSION PILOT TRAINING FLIGHT #5 ELT**  
**STUDENT**  
**I Flight / Area I**

**D. RETURN TO BASE**

1. Have the trainee determine the proper heading for the return to BAK, and let the trainee set up the navigational instruments as necessary.
2. Have the trainee contact BAK Tower.
3. Have the trainee handle communications with approach, tower, and ground control.

**E. DEBRIEFING**

1. Answer any questions. Ensure that the trainee thoroughly understands all aspects of electronic searches.
2. Let the trainee provide the information for the debriefing (104).
3. Sign the trainee's qualification card or 101-T.